PREVALENCE AND ANTIBIOGRAM OF BACTERIAL PATHOGENS ISOLATED FROM CANINE PYODERMA

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ABSTRACT

In the present study bacteriological examination was carried out on 85 superficial skin swab collected from different breeds of dogs suffering from superficial to deep pyoderma . Eight different species of bacteria were isolated from the 85 infected skin swabs. Mixed infection ofGram +ve and Gram –ve organisms were detected .*Staphylococosaureus* (85.8%) and *Enterobacteraerogene* (38.8%) were the predominant Gram +ve and Gram –ve bacteria isolated in the culture . On *invitro*antibiogram study, Ceftriaxone tazobactum, Amoxicillin-Clavulinic acid, Chloramphenicol, Levofloxacin, Framycetin and Mupirocin were found to be most sensitive with 100% efficacy against both Gram +ve and Gram –ve organism.

INTRODUCTION

The skin problems in dogs are the major concern due to its multifaceted causative agents, higher cost of treatment and long term management associated with prolonged unhealthy environment in respect to odour , hair fall and coat appearance. Therefore the identification of exact etiology in canine dermatitis is the key for successful therapeutic management (Danny and Mannon,1990). However, information on prevalence of different causative agents in skin disorders of canine are scanty. The normal inhabitant bacteria of skin coat *Staph-pseudointermedius* alone or along with other bacterial frequently invade the debrided skin causing pyoderma. This pyoderma not only has zoonotic importance but also have every chance of recurrence (Guardabassi *et al.*, 2004).The present study was designed to identify the bacterial pathogen (s) associated with pyoderma and to find out the *in vitro* antibiotic sensitive pattern of those pathogens collected from the superficial to deep pyodermal lesions in various breeds of dogs of different age groups.

MATERIALS AND METHODS

The prevalence and epidemiological study of skin diseases of various breeds of dogs was conducted on the cases presented at the Teaching Veterinary Clinical Complex, College of Veterinary Science and Animal Husbandry, Orissa University of Agriculture and Technology, Bhubaneswar,through examining the out-patient registration cards for the period from January-2012 to March – 2013.

Eighty five samples of superficial skin swabs were collected from dogs presented at the out door of Teaching Veterinary Clinical Complex, C.V.Sc & A.H, O.U.A.T, Bhubaneswar, suffering from pyoderma. The samples were subjected to bacterial isolation on Agar and cultural characteristics of those isolates were studied on MacConkey and nutrient Agar. The isolates on blood agar were examined for size of colonies, hemolytic changes and on Mac Conkey Agar for lactose and non-lactose fermenting mucoid colonies and on nutrient Agar for pigment production and swarming growth. Primarily, the isolates were biochemically characterized by KOH, Catalase, Oxidases and oxidation fermentation Test (Quinn *et al.,* 1994).Further, Secondary biochemical tests (Indole test,

methyl red (MR) test, Voges – proskeur (Vp) test, Citrate utilization test, Urease test, Nitrate reduction test, hydrogen sulphide production on triple sugar iron(TSI), agar and carbohydrate fermentation test were performed as per Barrow and Feltham (1993).

The bacterial isolates obtained were tested for their *in vitro* antibiotic sensitivity against 25 commonly used antibiotics in canine practice such as,.Amoxiclav, Ceftriaxone and Tazobactum,. Levofloxacin,Ofloxacin, Chloramphenicol, Doxycycline,Enrofloxacin,Tetracycline, Imipenum and cilastatin, .CefoperazoneSulbactum, Azithromycin, Moxifloxacin,Faropenem,Linezolid, Cefuroxime, Gentamycin,Cefdinir, PiperacillinTazo, Cefotaxim, Clindamycin, Neomycin, Mupirocin, Framycetin, Fusidic Acid and Cotrimoxazole by disc diffusion method (Bauer *et al.,* 1966).

The plates were incubated overnight at 37^{0C} and the zones of inhibition were measured. The measurements were compared with Zone size interpretative table supplied by Himedia Ltd, Mumbai, Zones were graded as highly sensitive, moderately sensitive and resistant. The moderately sensitive were considered as sensitive for calculation of overall sensitivity.

RESULT AND DISCUSSION

In the present epidemiological study on canine skin diseases, it was found that about 36% of total presented cases of dogs during the period from January-2012 to March-2013 presented at TVCC, CVSc and A.H., OUAT, Bhubaneswar were suffering from skin related problems. It was also found that out of those dogs suffering from skin diseases, 48% of dogs were found to suffer from superficial to deep pyoderma with various species of bacteria. This higher rate of incidence of canine skin diseases may be attributed from hot, humid climatic condition of coastal areas of Odisha. The higher rate of incidence of pyoderma in the present study indicates the favoured environmental condition for prolification of microorganisms in the scratched skin of dogs suffering from skin related problems.

Eight different species of bacteria were identified in 85 skin scrapings collected and undergone culture and sensitivity test in this present research programme as enlisted in Table 1.Mixed infection of two or more species out of those eight species identified were commonly seen in each sample. There was always mixed infection of Gram +ve and Gram –ve organisms in all the skin swabs.

Table. 1Microbial species isolated from superficial skin swabs from pyoderma affected dogs.

.Sl No.	Bacterial Species identified in the Skin Samples	Positive samples out of 85 swabs	Percentage of samples
01	Staphylococcus aureus	73	85.8%
02	Enterobacteraerogens	33	38.8%
03	Klebsiellapneumoniae	24	28.2%
04	Pseudomonas aeruginosa	17	20%
05	Micrococcus luteus	13	15.3%
06	Bacillus cereus	09	10.6%
07	Staphylococcuspseudointermedius	19	22.3%
08	Enterococcus feacalis	10	11.8%

Table No. 2 : In vitro antibiotic Sensitivities (%) of bacterial species isolated from dog skin

Sl No	Antibiotics	Staphyloccus aureus	Enterobacteraerogens	Klebsiellapneumoniae	Pseudomonas aeruginosa	Enterococcus feacalis	Micrococcus luteus	Bacillus cereus	Staphylococcus pseudointermedius
01	Amoxyclav	100	100	100	100	100	100	90	100
02	Ceftriaxone and Tazobactum	100	100	100	100	100	100	100	100
03	Levofloxacin	100	100	100	95	100	100	100	100
04	Ofloxacin	100	100	100	100	100	100	100	100
05	Chloramphenicol	100	100	100	100	100	100	100	100
06	Doxycycline	60	50	80	70	60	55	90	85
07	Enrofloxacin	70	90	50	40	(R)	70	50	70
08	Tetracycline	80	100	90	80	40	50	90	50
09	Imipenum & cilastatin	50	20	20	100	30	20	30	50
10	Cefoperazonesulbactum	95	100	100	100	100	100	100	100
11	Azithromycin	90	50	70	60	R	R	100	100
12	Moxifloxacin	60	30	30	30	R	90	60	80
13	Faropenum	30	50	R	R	R	30	R	30
14	Linezolid	100	60	50	20	40	100	30	80
15	Cefuroxime	50	30	R	30	R	50	R	20
16	Gentamycin	100	100	100	(R)	100	100	100	100
17	Cefdinir	50	60	30	30	20	R	R	40
18	PiperacillinTazo	30	20	30	R	20	R	80	30
19	Cefotaxim	40	30	40	R	50	40	80	40
20	Clindamycin	100	100	100	100	(R)	100	100	100
23	Neomycin	40	10	50	50	20	60	70	30
24	Mupirocin	100	100	100	100	100	100	100	100
25	Framycetin	100	100	100	100	100	100	100	100
26	Fusidic Acid	60	60	80	90	100	100	90	50
27	Cotrimoxazole	50	20	20	20	R	R	30	40

R: Resistance

There was absence of Gram +ve or only Gram-ve organisms alone in those samples. From Table 1 it is revealed that the predominancy order of infection was *Staphylococcusaureus - Enterobacteraerogens - Klebsiellapneumonia - Staphylococcus pseudiontermedius - Pseudomonasaeruginosa - Micrococcusluteus - Enterococcusfeacalis* and *Bacilluscereus*. Which is in agreement with the findings of Suresh *et al.* (2010) who had reported 92% prevalence of Staphyloccocus species in 24 dogs of different breeds suffering from deep pyoderma.

The susceptibility varies between different species of bacteria and also between Gram +ve and Gram -ve organisms. The *in vitro* susceptibility of different bacterial species to various antibiotic discs given in Table-2.

In the present study, Ceftriaxone and Tazobactum, Amoxyclav, Levofloxacin, Ofloxacin, Chloramphenicol, Cefoperazonesulbactum, Framycetin and Mupirocin had 100% efficacy against Gram +ve and Gram -ve organisms. The Clindamycin and Gentamycin have 100% efficacy against all isolated species, except *Enterococcusfeacalies* and *Pseudomonasaeruginosa* respectively.Tetracycline was more efficacious against Gram -ve organism than Gram +ve organism. Fusidic acid is more efficacious against Gram +ve organism than Gram -ve.This present finding is in agreement with the findings of Pedersen *et al.* (2007) who had reported that resistant to Cephalosporins and Amoxyclav was very low for all bacterial species.

Staphyloccous species have been reported to be highly sensitive to chloramphenicol followed by cephalexin and enerofloxacin in recurrent deep canine pyoderma (Suresh *et al.*, 2010). Similar findings are also reported in this experiment. *Staphylococous* species which is predominant one in pyoderma has shown resistance to various antibiotics as 40% to doxycycline,moxifloxacin and fusidic acid, 20% to tetracycline, 70% to faropenum, 50% to cefuroxime, cefdinir and imipenum, 60% to neomycin and cefotaxim and 30% to enerofloxacin. Similar findings have been reported by Ganiere *et al.* (2005). There is slight variation of percentage of resistance in some of the antibiotic discs used in this experiment as compared to the previous study which may be due to chronic infection in pyoderma of the selected cases.

The resistance pattern of *S.intermedius* against fusidic acid, tetracycline as documented in this study is similar to the findings of Tromso, Oslo. (2004) who had reported that S. intermedius has 59% resistance to Fusidic acid and 53% resistance to Tetracycline.

The present study has indicated that several bacterial species are always associated with pyoderma in dogs of different age and various breeds causing mixed infection. The antibiotic sensitivity vary among the isolated species of bacterias. There is also development of resistance among microorganisms against the available antibiotics. This study underlines the importance of exact identification of causative agent as well as their anti biogram pattern for cost effective successful treatment of pyoderma and their control programmes.

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